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09/654,348	09/01/2000	Nobuo Suzuki	P107317-00011	5974

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EXAMINER	
ROSENDALE, MATTHEW L	

ART UNIT	PAPER NUMBER
2612	3

DATE MAILED: 03/29/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/654,348	SUZUKI, NOBUO	
	Examiner	Art Unit	
	Matthew L Rosendale	2612	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *01 September 2000*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-36* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *1-16* is/are allowed.

6)☒ Claim(s) *17-36* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *01 September 2000* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

1. Claims 17 – 27, 29, 30, and 33 – 36 are rejected under 35 U.S.C. 102(b) as being anticipated by Aoki et al.

Referring to claim 17, Aoki discloses a solid-state image pickup device in figures 1A and 5, comprising; a semiconductor substrate 101; a large number of photoelectric converters 3 arranged on one surface of said semiconductor substrate 101 in a plurality of columns and a plurality of rows, each of said columns and said rows including a plurality of photoelectric converters 3, said photoelectric converters in odd ones of said columns being shifted about one half of a pitch P, in a direction of said column relative to said photoelectric converters in even ones of said columns , said photoelectric converters 3 in odd ones of said rows being shifted about one half of a pitch P2 in a direction of said row relative to said photoelectric converters 3 in even ones of said rows, each said photoelectric converter column including said photoelectric converters 3 of only said odd rows or said even rows; a vertical charge transfer channel provided for each said photoelectric converter column on the surface of said semiconductor substrate 101, each said channel being adjacent to an associated photoelectric converter column, each said channel including a plurality of sections of different directions lying in a line, said channel

generally extending, while meandering in a zigzag shape, in column direction; a plurality of transfer electrodes 1 and 2 disposed on the surface of said semiconductor substrate 101 to intersect in plan view said charge transfer channels, each said transfer electrode 1 and 2 including a plurality of transfer path forming regions which are equal in number to said charge transfer channels, each said transfer path forming region covering one of said sections of said charge transfer channels, said transfer path forming region 12(6) and said section disposed there under forming one charge transfer stage; each said transfer electrode generally extending in row direction, while two adjacent ones of said transfer electrodes 1 and 2 sandwiching one of said photoelectric converter rows there between and determining one photoelectric converter region for every second one of said photoelectric converter columns by meeting each other and parting from each other to enclose in plan view every one of said photoelectric converters in said odd or even row; and a readout gate region 112 disposed contiguous to each said photoelectric converter 3 in figure 5 and to an associated one of said charge transfer channels, said readout gate regions 112 being equal to each other in relative positional relationship with said associated photoelectric converter 3, each said readout gate region 112 associating to one of said photoelectric converter rows being covered in plan view with mutually different ones of said transfer path forming regions 12(6) of said one transfer electrode associating to said photoelectric converter row.

2. Referring to claim 18, Aoki discloses a solid-state image pickup device shown in figures 1A and 5, wherein said charge transfer channels and said transfer electrodes 1 and 2 configure at least two charge transfer stages 5 for each said photoelectric converter.

3. Referring to claim 19, Aoki discloses A solid-state image pickup device shown in figures 1A and 5, wherein said transfer electrodes 1 and 2 include a plurality of first transfer electrodes 1 and a plurality of second transfer electrodes 2, said first and second transfer electrodes 1 and 2 being alternately provided on the surface of said semiconductor substrate 101 to intersect in plan view said charge transfer channels, each said first and second transfer electrode 1 and 2 including a plurality of transfer path forming regions 12 and 22 which are equal in number to said charge transfer channels, each said transfer path forming region 12 and 22 covering one of said sections of said charge transfer channels, said transfer path forming region 12 and 22 and said section disposed there under forming one charge transfer stage 5; each said first and second transfer electrode 1 and 2 generally extending in row direction, while one of said first transfer electrodes and one of said second transfer electrodes adjacent to said one first transfer electrode sandwiching one of said photoelectric converter rows there between and determining one photoelectric converter region for every second one of said photoelectric converter columns by meeting each other and parting from each other to enclose in plan view every one of said photoelectric converters in said odd or even row.

4. Referring to claim 20, Aoki discloses a solid-state image pickup device shown in figures 1A and 5, wherein: each said readout gate region 112 6 contiguous to an odd one of said charge transfer channels is contiguous to said section covered with said transfer path forming region of said first transfer electrode 1, and each said readout gate region 112 6 contiguous to even one of said charge transfer channels is contiguous to said section covered with said transfer path forming region of another one of said first transfer electrodes 1.

5. Referring to claim 21, Aoki discloses a solid-state image pickup device shown in figures 1A and 5, further including a plurality of readout gate electrode regions 12(6), said readout gate electrode region 12(6) being disposed on each said readout gate region 112 and covering said readout gate region 112 in plan view, wherein each said readout gate electrode region 12(6) is a part of said transfer path forming region covering in plan view one of said section of said charge transfer channel contiguous to said readout gate region associating to said readout gate electrode region.

6. Referring to claim 22, Aoki discloses a solid-state image pickup device shown in figures 1A and 5, wherein said photoelectric converters are substantially equal to each other in contour, size, and direction in plan view.

7. Referring to claim 23, Aoki discloses a solid-state image pickup device shown in figures 1A and 5, wherein each said photoelectric converter region determined by said two adjacent transfer electrodes sandwiching said one photoelectric converter column there between has a contour of substantially a hexagon in plan view.

8. Referring to claim 24, Aoki discloses a solid-state image pickup device shown in figures 1A and 5, further including a light shielding film 111 having an opening provided for each said photoelectric converter 3, each said opening being disposed over the associated photoelectric converter 3.

9. Referring to claim 25, Aoki discloses a solid-state image pickup device shown in figures 1A and 5, wherein said openings are substantially equal to each other in contour, size, and direction in plan view.

10. Referring to claim 26, Aoki discloses a solid-state image pickup device shown in figures 1A and 5, wherein each said opening has a contour equal to a hexagon in plan view.

11. Referring to claim 27, Aoki discloses a solid-state image pickup device shown in figures 1A and 5, further including a microlens provided for each said opening, each said microlens 108 in figures 6A and 6B being disposed over the associated opening and covering the opening in plan view.

12. Referring to claim 29, Aoki discloses a solid-state image pickup device shown in figures 1A and 5, further including a driver circuit (not shown) for applying filed shift pulses respectively to said transfer electrodes 1 and 2 of which said transfer path forming regions cover said readout gate regions in plan view (Col. 5, Lines 26 – 44).

13. Referring to claim 30, Aoki discloses a solid-state image pickup device shown in figures 1A and 5, further including a driver circuit (not shown) for applying filed shift pulses respectively to said first and second transfer electrodes 1 and 2 (Col. 5, Lines 26 – 44).

14. Referring to claim 33, Aoki discloses a method of driving the solid-state image pickup device in figures 1A and 5 comprising a semiconductor substrate 101; a large number of photoelectric converters 3 arranged on one surface of said semiconductor substrate 101 in a plurality of columns and a plurality of rows, each of said columns and said rows including a plurality of photoelectric converters 3, said photoelectric converters 3 in odd ones of said columns being shifted about one half of a pitch P, in a direction of said column relative to said photoelectric converters 3 in even ones of said columns , said photoelectric converters 3 in odd ones of said rows being shifted about one half of a pitch P2 in a direction of said row relative to said photoelectric converters in even ones of said rows, each said photoelectric converter column including said photoelectric converters 3 of only said odd rows or said even rows; a vertical charge transfer channel provided for each said photoelectric converter column on the surface of said semiconductor substrate 101, each said channel being adjacent to an associated photoelectric converter column, each said channel including a plurality of sections of different directions lying in a line, said channel generally extending, while meandering in a zigzag shape, in column direction; a plurality of transfer electrodes 1 and 2 disposed on the surface of said semiconductor substrate 101 to intersect in plan view said charge transfer channels, each said transfer electrode 1 and 2 including a plurality of transfer path forming regions which are equal in number to said charge transfer channels, each said transfer path forming region covering one of said sections of said charge transfer channels, said transfer path forming region and said section disposed there under forming one charge transfer stage 2 and 12; each said transfer electrode generally extending in row direction, while two adjacent ones of said transfer electrodes sandwiching one of said photoelectric converter rows there between and determining one photoelectric converter

region for every second one of said photoelectric converter columns by meeting each other and parting from each other to enclose in plan view every one of said photoelectric converters in said odd or even row; and a readout gate region disposed 112 contiguous to each said photoelectric converter and to an associated one of said charge transfer channels, said readout gate regions being equal to each other in relative positional relationship with said associated photoelectric converter 3, each said readout gate region associating to one of said photoelectric converter rows being covered in plan view with mutually different ones of said transfer path forming regions 12(6) of said one transfer electrode 1 and 2 associating to said photoelectric converter row, comprising the steps of: reading out, in one vertical blanking period, signal charge stored in each said photoelectric converter of at least part of said photoelectric converter rows, via said associated readout gate region 112 contiguous to said photoelectric converter 3, to said associated charge transfer channel contiguous to said associated readout gate region; and converting, from the vertical blanking period to a next vertical blanking period subsequent thereto, each said signal charge read out to said charge transfer channel into an image signal and outputting the image signal.

15. Referring to claim 34, Aoki discloses a solid-state image pickup device driving method, wherein said charge transfer channels and said transfer electrodes configure at least two charge transfer stages 11 and 12 for each said photoelectric converter.

16. Referring to claim 35, Aoki discloses a solid-state image pickup device driving method, wherein said transfer electrodes include a plurality of first transfer electrodes 1 and a plurality of

second transfer electrodes 2, said first and second transfer electrodes 1 and 2 being alternately provided on the surface of said semiconductor substrate to intersect in plan view said charge transfer channels, each said first and second transfer electrode 1 and 2 including a plurality of transfer path forming regions which are equal in number to said charge transfer channels, each said transfer path forming region 2 and 12 covering one of said sections of said charge transfer channels, said transfer path forming region and said section disposed there under forming one charge transfer stage; each said first and second transfer electrode 1 and 2 generally extending in row direction, while one of said first transfer electrodes 1 and one of said second transfer electrodes 2 adjacent to said one first transfer electrode sandwiching one of said photoelectric converter rows there between and determining one photoelectric converter region for every second one of said photoelectric converter columns by meeting each other and parting from each other to enclose in plan view every one of said photoelectric converters in said odd or even row.

17. Referring to claim 36, Aoki discloses a solid-state image pickup device driving method, wherein each said readout gate region 112 contiguous to odd one of said charge transfer channels 12 is contiguous to said section covered with said transfer path forming region of said first transfer electrode, and each said readout gate region 112 contiguous to even one of said charge transfer channels is contiguous to said section covered with said transfer path forming region of another one of said first transfer electrodes 1.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

18. Claim 28 is rejected under 35 U.S.C. 103(a) as being unpatentable over Aoki et al.

Referring to claim 28, Aoki discloses a solid-state image pickup device shown in figures 1A and 5, but does not further include a color filter provided for each region between said opening and said microlens shown in figures 6A and 6B associating to the opening, said color filter covering the associated opening in plan view. However, Official Notice is taken that providing a color filter for each pixel sensor is well known. Therefore it would have been obvious to provide a color filter at each opening for each pixel sensor so as to capture images in color instead of only monochrome.

19. Claims 31 and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Aoki et al in view of Sekine.

Referring to claim 31 , Aoki discloses a solid-state image pickup device shown in figures 1A and 5 but does not specifically show the output means of the sensor. However, Sekine discloses an image sensor in figure 1 further including a output transfer path 30 being composed of a CCD of two-phase driving type with two-layer electrode structure, said output transfer path 30 receives, via said charge transfer channels, signal charge stored in each said photoelectric converter through photoelectric conversion conducted by said each photoelectric converter and transfers said signal charge in a predetermined direction.

Therefore it would have been obvious to provide the output transfer path of Sekine with the image sensor of Aoki so that charges can be output from the image sensor to form an electronic image.

20. Referring to claim 32, Sekine discloses a solid-state image pickup device shown in figure 1 further including an adjusting section 260, said adjusting section 260 including an adjusting charge transfer channel for each said charge transfer channel connected to one end thereof, said adjusting charge transfer channels changing, before said signal charge is transferred to said output transfer path 30, the transfer direction of said signal charge and adjusting mutual pitch in said photoelectric converter row direction to a constant value.

Allowable Subject Matter

Claims 1 – 16 are allowed.

The following is a statement of reasons for the indication of allowable subject matter:

Referring to claims 1 and 14, the prior art fails to teach or suggest each charge transfer channel having a first width at the location where the channel is contiguous to the readout gate region and a second width at a location where the channel is separated from the readout gate where the first width is less than the second width.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Matthew L Rosendale whose telephone number is (703) 305-4909. The examiner can normally be reached on Monday - Friday 8: 00am-4: 00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wendy Garber can be reached on (703) 305-4929. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

MLR

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